IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION

VIGILANT INSURANCE COMPANY, Plaintiff, vs. TURNER BROADCASTING SYSTEM, INC., TURNER STUDIOS, INC., HI-TECH FX LLC and INTERIOR FIRE PROTECTION, INC., Defendants.	)	CIVIL ACTION FILE NO. 1:10-CV-592-RLV

AFFIDAVIT OF DANIEL L. ARNOLD, P.E., FSFPE

I, Daniel L. Arnold, P.E., FSFPE being over the age of eighteen years and not suffering from any disability that would render me incompetent to testify, give the following testimony under oath for use in the above-styled case:

1. I was retained by Plaintiff in this case to investigate and determine why the installed fire sprinkler system that suppressed the December 21, 2008 fire at Production Consultants and Equipment ("PC&E") failed to trigger the automatic electric alarm that was installed and monitored to automatically provide notification of sprinkler water flow to the remote supervising station monitoring the building.

2. As set forth in my CV, which is attached here as Exhibit A, I have been a practicing fire protection engineer for over thirty years. My areas of professional expertise include, among other things, fire protection systems designed to control, suppress, and extinguish fires, as well as fire detection, alarm and notification systems. In addition to consulting and design experience, I have extensive experience investigating fire protection system failures, including failures of fire sprinkler systems and fire detection, alarm and notification systems.

3. I am a registered professional engineer in Georgia, in addition to Delaware, Florida, Alabama, Tennessee, North Carolina, South Carolina, Pennsylvania, Indiana, Ohio, Texas, Mississippi, Arkansas, and Virginia.

4. I am an elected Fellow in the Society of Fire Protection Engineers, as well as a member of the Southeastern Chapter Executive Committee and a Past President of the Southeastern Chapter. I am a member of the National Society of Professional Engineers, American Council of Engineering Companies, National Fire Protection Association, Georgia Fire Inspector's Association, and the International Code Council.

5. In the course of my work in this case, I identified an inoperative alarm pressure switch that was installed on the sprinkler system as the cause of the December 21, 2008, alarm failure at PC&E. I also rendered an opinion that the last

required annual inspection of the sprinkler system, conducted on January 2, 2008, was improperly performed by the Defendant in this case, Interior Fire Protection, Inc. I have also opined that, had the annual inspection been performed properly, the inoperative alarm pressure switch would have been detected, allowing it to be replaced and the owner, PC&E, to avoid a substantial portion of the damages that occurred on December 21, 2008 due to the excessive duration of water flow from the sprinklers that opened to suppress the fire.

6. My opinions were reached using accepted practices and procedures for the testing and evaluation of scientific or technical data and for conducting loss investigations of this type. More specifically, the investigation included operational in-situ field testing of the pressure switches after the fire; in-situ inspection and testing of the installed alarm panel, field circuits and wiring and alarm/telephone transmission capabilities; examination and testing of the pressure switches and functional testing of the alarm panel that was installed on the day of the fire.

7. In response, Interior Fire Protection has retained Stuart Huse, who has opined that Interior's January 2, 2008, inspection was not done improperly. In his report and deposition testimony, Mr. Huse has offered a number of other potential causes for the notification failure, including an alleged failure by PC&E's remote alarm monitoring service provider, Ackerman Security, to test the pressure switch;

contended improper wiring of alarm circuits by both Ackerman and PC&E's previous alarm service provider, Sonitrol; and possible alarm panel programming errors by both Ackerman and Sonitrol.

8. Based on my education, training, and experience, it is clear that Mr. Huse is not qualified to render expert opinions regarding the sufficiency of a fire protection sprinkler system inspection, or any other matter regarding fire protection sprinkler systems. He also demonstrates a lack of understanding of basic concepts pertaining to sprinkler system alarm monitoring, which causes me to question whether he has the necessary qualifications to testify regarding the alarm issues in this case. Further, his method of analyzing the alarm aspects of this case is faulty and not capable of generating reliable conclusions.

Interior Fire Protection's Inspection

9. In Georgia, the design, installation, repair, test, and inspection of fire protection sprinkler systems is governed by the Georgia Fire Sprinkler Act, O.C.G.A. § 25-11-1 through 19. The Georgia Safety Fire Commissioner issues rules and regulations to enforce the Georgia Fire Sprinkler Act. (The Rules and Regulations of the Safety Fire Commissioner, Chapter 120-3-19, "Rules and Regulations for Enforcement of the 'Georgia Fire Sprinkler Act'"). The Rules and Regulations of the Georgia Fire Sprinkler Act have adopted National Fire

Protection Association Standard 25 (NFPA 25), "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," as the minimum state-wide standard for the inspection of fire sprinkler systems. Section 120-3-19.12 of the Rules and Regulations for the Enforcement of the Georgia Fire Sprinkler Act provides: "All inspections, testing, and maintenance of water-based fire protection systems shall be done in accordance with the requirements of NFPA 25 as adopted and amended by the Georgia Safety Fire Commissioner's Rules and Regulations, Chapter 120-3-3. The 2002 edition of NFPA 25 was in effect when Interior Fire Protection inspected PC&E's fire sprinkler system on January 2, 2008. (Rules and Regulations of the Safety Fire Commissioner § 123-3-3-.04 (18).

10. NFPA 25 (2002 ed.) governed the sprinkler system inspection that was done at PC&E on January 2, 2008, as well as the corresponding responsibilities of Interior Fire Protection and PC&E.

11. Although NFPA 25 places responsibility for properly maintaining a sprinkler system on the owner, it also contemplates that this responsibility may be fulfilled by contracting with a qualified inspection service. (NFPA 25, ¶ 4.1.2 and A4.1.2.) Pursuant to the Georgia Fire Sprinkler Act and the Rules and Regulations of the Safety Fire Commissioner, Chapter 120-3-19-.12, only a licensed "fire protection system inspector" or "certificate of competency holder" is authorized to

inspect fire protection sprinkler systems in Georgia. In order to obtain the requisite fire protection system inspector's license or certificate, Chapter 120-3-19-.07 requires the applicant to submit an application to the Georgia Safety Fire Commissioner and, at a minimum, demonstrates competence in the field by proving that they are Level III certified by the National Institute for Certification in Engineering Technologies (NICET Level III) or demonstrate adequate technical knowledge and ability in accordance with recognized standards as adopted by the Commissioner to perform such inspections.

12. The only exception to these licensing requirements is if a building owner chooses to perform sprinkler inspections with their own representatives. In such cases, the representatives of the building owner must provide to the appropriate authority written notice of their intent to do such inspections and provide proof that the representative has the necessary knowledge and expertise to perform such a sprinkler inspection, including "a detailed description of each individual's knowledge of NFPA 25." (Rules and Regulations of the Safety Fire Commissioner, Chapter 120-3-19-.12(2)).

13. In his deposition, Mr. Huse admitted that he does not have a NICET Level III certification and that he is not qualified under Georgia law to inspect or test water-based fire protection systems. He is not now, nor has he ever been,

licensed in any state to inspect fire protection sprinkler systems. (Huse Depo., p. 99). He is not familiar with the NFPA 25 requirements for inspection, testing, and maintaining water-based fire protection systems. (*Id.* p. 112). He admitted that he does not have specific knowledge of the NFPA 25 requirements for inspection and testing of pressure switches, which is a key issue in this case. (*Id.* at p. 113). In fact, Mr. Huse explicitly stated that he is not an expert in sprinkler systems or the inspection, testing, and maintenance of sprinkler systems. (*Id.* at., pp. 86).

14. It is evident from his deposition testimony that Mr. Huse is totally lacking in the basic knowledge concerning the statutory and technical requirements for properly inspecting a fire protection sprinkler system in Georgia. Without expertise in sprinkler systems, including familiarity with NFPA 25 and the technical characteristics of a sprinkler system as would be demonstrated by a NICET Level III certification, certificate of competency or other equivalent experience, technical knowledge and qualifications, it is impossible to render reliable opinions regarding the relative responsibilities of a property owner versus a hired contractor with regard to sprinkler inspections; how to perform a proper sprinkler inspection; how to confirm the proper working order of a pressure switch; and how to properly document a sprinkler inspection. In this case in particular,

Mr. Huse is clearly not qualified to give an opinion regarding how Interior performed its inspection of PC&E's sprinkler system; whether the inspection was performed properly; what Interior did or should have done, and what Interior's inspector, Marvin Grindle, knew or should have known; or the relative responsibilities of Interior and the owner PC&E.

15. For example, in his report, Mr. Huse stated that

> "It is my opinion that Mr. Grindle was not responsible for interpreting the "beeping" he heard coming from the customer's keypad or interpreting the flashing lights or English which may have been displayed on the customer's keypad. It is unreasonable to expect him to be familiar with each and every security/fire system he comes into contact with during his daily inspections." (Huse Report, Dec. 10, 2010, p. 2).

The purpose of an NFPA 25 sprinkler inspection is, among other things, to verify the proper operation of alarm devices. (NFPA 25, ¶ 5.3.3). In fact, NFPA 25 expressly states that "[a]ll components and systems shall be tested to verify that they function as intended." NFPA 25, § 4.5.1 (2002 ed.). Mr. Gindle could not verify whether the pressure switch components and monitoring system functioned "as intended" without interpreting the beeping he allegedly heard coming from a keypad or discerning that the display on the keypad was correct. Contrary to Mr. Huse's opinion, it is not unreasonable to expect Mr. Grindle to be generally familiar with the various alarm and monitoring systems he comes into contact with

during the course of a sprinkler inspection. Rather it is essential that he have this basic level of familiarity with such systems in order to perform a proper sprinkler inspection pursuant to NFPA 25, the Georgia Fire Sprinkler Act, and the Rules and Regulations of the Georgia Safety Fire Commissioner. Mr. Huse apparently does not know this since he is not adequately familiar with NFPA 25 or the applicable rules and regulations, and does not have the requisite licensing, training, experience or qualifications.

16. In short, Mr. Huse's report, CV, and deposition testimony show no evidence that he has the requisite qualifications or experience to render opinions regarding any aspect of a fire sprinkler system inspection. Indeed, the evidence shows affirmatively that he has no such qualifications or experience.

Mr. Huse's Testimony Regarding Alarm Issues

Qualifications

17. According to his CV, Mr. Huse apparently has extensive experience selling alarm systems. However, he has a fundamental misunderstanding of some basic technical concepts contained in NFPA 72, the National Fire Alarm Code, which has been adopted in Georgia by the Rules and Regulations of the Safety Fire Commissioner, Chapter 120-3-3-.04 (49).

18. For example, Mr. Huse stated in his report that the alarm system in place at PC&E was of the type "described in NFPA 72, Chapter 26, as a 'central station.'" (Huse Report, Dec. 10, 2010, p. 1). However, NFPA 72, Chapter 26, has a specific definition of "central station service" which applies only to alarm services that include, among other things, "alarm, guard, supervisory, and trouble signal monitoring," and "runner service." (*See* NFPA 72, 2010 Edition, ¶ 26.3.2). This is a comprehensive alarm service that may be described pursuant to NFPA 72 as "central station service" only if all required elements are present.

19. PC&E was not required and did not have "central station" alarm service. PC&E's alarm service included remote monitoring, but did not include aspects of "central station service" such as guard service or runner service. In fact, the alarm system that PC&E had in place was what NFPA 72 describes as a "remote supervising station" alarm system. (*Id.* at ¶ 3.3.267). This type of service may be provided "where central station service is neither required nor elected." (*Id.* at ¶ 26.5.1).

20. When asked in his deposition to clarify whether PC&E had NFPA "central station" or "remote supervisory station" alarm service, Mr. Huse stated that "they use those words interchangeably." (Huse depo. p. 478). This is clearly wrong. As noted above, NFPA 72 does not use the terms "central station" and

"remote supervising station" interchangeably. In fact, under NFPA 72, the terms are mutually exclusive.

21. It is also worth noting that Mr. Huse references the wrong edition of NFPA 72 in his report. "Central Station Service" is described in Chapter 26 of the 2010 edition of NFPA 72. (Huse Depo., p. 475). At the time of Interior's January 2008 inspection at PC&E, the 2010 edition of NFPA 72 had not even been published. At all times relevant to this case, the 2002 edition of NFPA 72 was in effect in Georgia. (*Id.* at 477). Central Station Service and Remote Supervising Station systems are described in Chapter 8 of the 2002 edition of NFPA 72. Mr. Huse is clearly citing to the wrong edition of NFPA 72 in his report.

22. Mr. Huse's testimony also demonstrates a fundamental lack of understanding of electrical circuits, and, in particular, the circuits often used in fire alarm systems. Mr. Huse testified that when a pressure switch activates, the switch contacts close and the alarm panel "senses tons of resistance. In other words, when you throw a dead short against it, you are creating more than 1,000 ohms of resistance, and that's how it knows it's an alarm." (Huse depo., p. 304).

23. Further, he testified that:

> "The fact is, is that it [the circuit] has to have a resistor on it in order for it to be normal. And if it shorts, it's always been my understanding that that puts a high amount of resistance on the wire." (Huse depo., p. 305).

24. In fact, Mr. Huse is completely wrong. It is true that the alarm circuit to the subject pressure switches must have a resistor installed to operate properly. The alarm panel detects the electrical resistance created by the resistor to electrically supervise that the circuit wiring is intact and continuous (e.g. no wire breaks or disconnections). When a pressure switch activates, a contact within the switch closes, allowing the current to flow through the pressure switch contact rather than through the resistor. The alarm panel detects the resulting loss of resistance, not an increase in resistance, and signals an alarm condition for that circuit. Mr. Huse's testimony regarding how a pressure switch operates in a fire alarm circuit demonstrates a fundamental misunderstanding of electrical circuits in general and how the alarm circuit for the pressure switch in this matter worked in particular.

25. Mr. Huse's fundamental misunderstanding of the basic terminology and concepts of NFPA 72, his apparent inability to identify and cite to the correct edition of NFPA 72 applicable to the events at issue, and his misunderstanding of electrical circuits and the operation of pressure switches, calls into question his qualifications to render opinions regarding any aspect of PC&E's alarm system or the provided alarm service.

Methodology

26. It is clear from his deposition testimony that Mr. Huse did not employ any methodology in this case that is capable of producing reliable conclusions.

27. NFPA 921, "Guide for Fire and Explosion Investigations," recommends that investigators follow what is known as the "scientific method." The scientific method requires the investigator to follow these steps: (1) identify the problem, (2) define the problem (i.e., define the manner in which the problem can be solved), (3) collect data, (4) analyze the data, (5) develop a hypothesis, (6) test the hypothesis, and (7) select a final hypothesis. NFPA 921, Chapter 4. Although the investigation into the circumstances of the alarm failure at PC&E may or may not be considered a "fire investigation," the scientific method described in NFPA 921 is also recommended in ASTM as the generally accepted methodology for conducting an investigation of this nature.

28. ASTM International (formerly the American Society for Testing Materials) Standard E678-07, "Standard Practice for Evaluation of Scientific or Technical Data," describes the minimum acceptable procedures to be used in "forming scientific or technical expert opinions." A copy of ASTM E678-07 is attached to this affidavit as Exhibit B. Although it does not use the term "scientific method," the method described by ASTM E678-07 is in fact the scientific method,

which includes such basic steps as problem identification, data collection, hypothesis development, and evaluation (testing).

29. ASTM E678-07 states that "opinions should be formed or conclusions drawn only after the data have been evaluated. Opinions or conclusions must account for all known relevant facts related to the incident and be consistent with accepted scientific and logical principles." (E678-07, ¶ 6.1).

30. In his deposition, Mr. Huse testified that he was not familiar with the scientific methodology described in ASTM E678-07 and NFPA 921. (Huse Depo., pp. 473-74). He was not able to describe the scientific method or the steps that it employs. (*Id.* at 486).

31. If Mr. Huse had, by chance, employed the scientific method, even though he was not familiar with its formal description, then his lack of familiarity with ASTM E678-07 and NFPA 921 might be immaterial. However, Mr. Huse's testimony makes clear that he did not employ a scientific methodology. This is evident because he developed a biased problem definition and failed to even look at, much less consider, important data.

32. For example, a key issue in this case is whether Interior's inspector, Marvin Grindle, properly tested the water pressure switches installed on PC&E's sprinkler system. Mr. Grindle stated that in the course of his inspection, an alarm

system keypad beeped when he tested one pressure switch and then reset itself and stopped beeping. He testified that the keypad again beeped after he tested the second pressure switch two, and then again reset itself when he was finished. He testified that the keypad beeping was the indication he relied upon that the pressure switches operated properly and generated the required alarm signals. (Grindle depo., pp. 70-74; Huse depo. p. 402) However, a properly operating alarm system would not have reset itself between the pressure switch tests. (Huse Depo., pp. 402-03, 569-70). Further, Mr. Huse testified that the purpose of section one of his report was "to explain why the keypad was beeping and reset itself." (Huse Depo., pp. 403, 460). Bolstering the credibility of a particular party's witness is not a proper purpose of an investigation conducted with an intent to form an expert technical opinion.

33. It is apparent from Mr. Huse's deposition testimony that he was unaware of important evidence in this case. Even more troubling, he ignored the existence of important evidence of which he was aware. For example, Mr. Huse testified that he did not read the depositions of important witnesses, such as the PC&E employees, Ackerman Security employees, or the Ackerman subcontractor that installed the alarm panel at issue. (Huse Depo., pp. 181-183). Several of the

depositions he reviewed did not have important exhibits attached, and he did not obtain the exhibits. (Huse Depo., pp. 576-580).

34. Before writing his report, he was unaware that there was a February 20, 2009, test of the pressure switches while they were still installed at PC&E's facility. (Huse Depo., pp. 390-391). He was also unaware of the results of the April 21, 2009, laboratory test of the pressure switches. (*Id.* at 399-400). He was unaware that the April 21, 2009, test of the pressure switches showed that they were wired normally open, contrary to his report in which he indicates that the switches must have been wired "normally closed." (*Id.*). Before writing his report and rendering his opinions, Mr. Huse conducted absolutely no testing of any component of the alarm system or the sprinkler system to test his opinions. (Huse Depo., pp. 234-235).

35. Most troubling, even when Mr. Huse became aware that the April 21, 2009, laboratory test of the pressure switches and the July 27, 2009, test of the alarm panel were videotaped, he did not make any effort to obtain the videotapes of these tests and view them. Mr. Huse testified that "it would be a waste of time," that he "thought it would be unnecessary," and that "there would be nothing to glean from it." (Huse depo., pp. 42, 45-46).

36. That Mr. Huse would think it unnecessary to review the laboratory tests on key physical evidence in this case, the pressure switches and the alarm panel at issue, highlights his lack of adherence to the scientific method, which emphasizes the collection and review of all relevant data. ASTM E678-07 states that, "opinions should be formed or conclusions drawn only after the data have been evaluated." Obviously, Mr. Huse could not have evaluated the laboratory test data if he refused to even look at it.

Reliability

37. Mr. Huse's failure to use any recognized methodology for investigating this matter, and his specific failure to review important, relevant data, makes it impossible for him to render reliable opinions in this matter. The nature of the ultimate conclusions reached by Mr. Huse exemplifies their inherent unreliability.

38. Mr. Huse first concludes that Interior's inspector, Marvin Grindle, testified correctly when he stated that PC&E's alarm system beeped and then reset itself during the January 2, 2008, sprinkler inspection. According to Mr. Huse, "[Grindle] said it beeped. I believe him." (Huse Depo., p. 462).

39. Although it is appropriate for an investigator to consider witness testimony along with all other relevant data, it is not appropriate for an investigator

to unquestioningly accept the testimony of a single witness. Any experienced forensic investigator knows that witness testimony is the type of data most susceptible to error due to a number of factors, such as the limitations of human perception and memory and possible bias. Bias is a particular concern when the witness providing the testimony is a party representative, such as Mr. Grindle, because it may color the testimony, sometimes inadvertently, sometimes intentionally.

40. Because Mr. Huse accepts without question Mr. Grindle's testimony, he is forced to develop an elaborate hypothesis that explains it. This hypothesis involves four independent alleged acts of negligence by the two different alarm companies that provided service to PC&E during the relevant time period. According to Mr. Huse:

A. Sonitrol (the company providing alarm service during the January 2, 2008, sprinkler inspection, improperly wired the water pressure switch circuit in a "normally closed," series configuration, instead of the correct "normally open," parallel circuit. (Huse depo. pp. 403-04). This theory is necessary because an alarm keypad will not reset itself after being triggered by an alarm signal from a properly wired pressure switch.

B. Sonitrol also improperly programmed the alarm circuit panel, which prevented it from transmitting a "trouble" signal during the January 2, 2008, sprinkler inspection. (*Id.* at 405-06). This theory is necessary to explain why no trouble signal was recorded by Sonitrol during the inspection, as should have been the case if the circuit was wired normally closed in series, as Mr. Huse speculates, and the pressure switch was working when tested by Mr. Grindle.

C. When Ackerman Security took over PC&E's account, its technician (a subcontractor) detected Sonitrol's improper wiring, and attempted to correct it, but instead improperly wired it yet again. (Huse depo. p. 423, 428-29). This theory is necessary to explain the fact that, after the fire, I found the subject circuit completely intact, wired normally open in parallel, not normally closed in series, but with a misplaced resistor that would not have affected the ability of the pressure switch to transmit an alarm.

D. The Ackerman alarm panel was also incorrectly programmed to prevent it from sending an alarm signal during the December 21, 2008, incident. (Huse depo., pp. 369-71).

41. Mr. Huse's opinions essentially take a single data point, Grindle's testimony, and then build four layers of inferences upon that testimony in order to explain it. Although Mr. Huse argued that items B and C above were really one item (Huse depo., p. 371-372), he agreed that all of those conditions would have had to exist in order for his opinion to have any validity. (*Id.* at 370). Take away any one of the alleged failures by either Sonitrol or Ackerman, and Mr. Huse's hypothesis cannot possibly be correct. This "stacking of inferences" methodology used by Mr. Huse is not an accepted method for use in a forensic investigation and is inherently unreliable.

42. A much simpler and more reliable explanation is that the water pressure switch was inoperative during the January 2, 2008, sprinkler inspection and during the December 21, 2008, fire, and that Mr. Grindle did not perform a proper test of the switch. This is consistent with all known data, including the fact that I found the 40-year old pressure switch in an inoperative condition both after the fire and during subsequent laboratory tests. Further, this conclusion requires no speculation regarding miswiring by either Sonitrol or Ackerman, for which there is no evidence, other than the testimony of Mr. Grindle that he allegedly heard a single keypad beeping through two exterior doors during his sprinkler inspection, or speculation regarding improper programming.

Conclusion

43. Based upon my review of the evidence in this case, Mr. Huse's report, and his deposition testimony, Mr. Huse appears to lack the qualifications to provide reliable testimony regarding the issues in this case. Further, his methodology is lacking and his conclusions are inherently unreliable.

Daniel L. Arnold, P.E., FSFPE

Sworn to and Subscribed
before me this 16th day
of February, 2011.

Notary Public
My Commission Expires: June 4, 2011

SETH WILES NOTARY PUBLIC EXPIRES GEORGIA June 4, 2011 COBB COUNTY

EXHIBIT A TO ARNOLD AFFIDAVIT

Appendix B

DANIEL L. ARNOLD, P.E., FSFPE

EDUCATION:

University of Maryland
Bachelor of Science in Fire Protection Engineering, 1980

PROFESSIONAL EXPERIENCE:

2001 - Present

SENECA FIRE ENGINEERING, LLC, Marietta, GA
Principal Fire Protection Engineer

Consulting fire protection engineer. Fire protection system design and evaluation. Building, fire and life safety code analysis, equivalencies and negotiations. Property fire protection condition surveys and audits. Fire investigation and litigation/expert support services.

1985 – 2001

ROLF JENSEN & ASSOCIATES, INC., Atlanta, GA
Engineering Manager/Vice President

Design, evaluation and consulting fire protection engineering projects. Conceptual planning, design in inspection of fire protection systems including sprinkler, water supply, standpipe, fire alarm, detection and alarm systems. Consult on building code issues related to fire and life safety.

1983 – 1985

BECHTEL CORPORATION, Gaithersburg, MD
Fire Protection Engineer

Consulting engineer in areas of fire protection and mechanical engineering. Implemented fire protection requirements. Performed fire hazard analyses including ensuring compliance with regulatory requirements, postulating fire scenarios and the evaluation of general plant fire safety. Developed conceptual fire protection system design and reviewed existing systems for modifications.

1982 – 1983

ROTHFUSS ENGINEERING CORPORATION
Staff Fire Protection Engineer

Performed fire protection system surveys including as-built system walk downs, acceptance tests, preparing operation and technical procedures, fire brigade training and fire pre-plan development. Designed fire protection systems including detailed drawing development, water supply system modifications and specifications.

1980 – 1982 **BECHTEL CORPORATION**, Gaithersburg, MD
Systems Engineer

Designed and specified fire protection systems including automatic sprinklers, fire pumps, water spray and deluge systems, standpipes, halon and fire alarm detection systems. Provided technical guidelines in areas of fire barrier design including walls, floors/ceiling assemblies, fire doors, dampers and penetration seals as well as egress design and general life safety issues.

1980 **UNIVERSITY OF MARYLAND**, Fire Protection Department
Student Research Assistant

Involved in the expansion of the U.S. Fire Administration's Programmed Planning Guide. Participated in the development of the final reports submitted to the USFA.

1974 – 1985 **PRINCE GEORGES COUNTY, MD**
Firefighter

Active volunteer firefighter in large combination department obtaining rank of Lieutenant. Emergency apparatus operator including mobile fire pumps and aerial ladders. Duties included commanding units and personnel and training volunteer recruits.

PROFESSIONAL AFFILIATIONS:

National Society of Professional Engineers, Member
American Council of Engineering Companies, Member
National Fire Protection Association, Member
Georgia Fire Inspector's Association
Society of Fire Protection Engineers, Fellow
Southeastern Chapter, Executive Committee
Southeastern Chapter, Past President
International Code Council (ICC)

REGISTRATION:

Professional Engineer

Delaware	Tennessee	Indiana	Arkansas
Florida	North Carolina	Ohio	Virginia
Georgia	South Carolina	Texas	
Alabama	Pennsylvania	Mississippi	

COMMITTEE MEMBERSHIPS:

NFPA 13, Technical Committee on Automatic Sprinkler System, Installation Criteria, Alternate Member (Former)

NFPA 92A, Technical Committee on Smoke Management Systems, Principal Member (Former)

Society of Fire Protection Engineers, Southeastern Chapter, Past President and Executive Committee

Commission on Fire Safety and Preparedness, U.S. Department of Energy

SELECTED SEMINARS & SPECIAL COURSES ATTENDED:

"Basic and Intermediate Fire Fighting, Maryland Fire and Rescue Institute.

"Foam Systems Seminar," National Foam.

"Construction Scheduling Seminar," Maryland Society of Professional Engineers.

"Fire Protection for Power Plants," Bechtel Power Corporation."

"Enclosure Fire Hazard Analysis," Fire Protection Engineering Dept., Univ. of Maryland.

"Flashover Seminar", Society of Fire Protection Engineers.

SELECTED TECHNICAL PAPERS, PUBLICATIONS AND SPEECHES:

"Computer Support System for the Programmed Planning Guide," United States Fire Administration, Watts, Arnold and Milke, 1981.

"Emerging Technology and Fire Protection," Atlanta, Georgia, April 1991.

"Sprinklers and Glazing," Society of Fire Protection Engineers, Southeastern Chapter, 1991.

"Fire Protection Systems Piping," *Piping Handbook*, 6th Edition, 1992.

"Failure of a Sprinkler System: A Case Study," *Fire Protection Engineering,* Issue No. 21, Winter 2004.

"Suppression System Failures: Case Studies," Fire Safety Conference, SFPE Greater Atlanta Chapter, 2005, 2010.

	Action	Location
1.	Eugene V. Fife and Lu Ann L. Fife v. Kiawah Island Utility, Inc., Kiawah Resort Associates, L/P. d/b/a Kiawah Resort Associates	Charleston, SC
2.	Waretex Industries, LTD., et al. v. Town & Country, et al. State of South Carolina, County of Greenwood	Greenville, SC
3.	Marc P. Malcuit, et al., v. SMD, Inc., et al. Circuit Court of Warren County, Kentucky	Warren Co., KY
4.	ConAgra, Inc., v. Wilson Foods Corporation, Doskocil Companies, Inc., Normac Foods, Inc., and Thompson Builders of Marshall, Inc.;	Overland Park, KS
5.	Revman Industries, Inc. v. Montgomery Industries, Inc., et al. Court of Common Pleas, Spartanburg Co., S.C.	Spartanburg, SC
6.	Empire Distributors, Inc., et al v. Heaven Hills Distilleries, Inc. Jefferson Circuit Court, Division Two Jefferson County, Kentucky	Louisville, KY
7.	Davis, as Administrator v. Pittway Corporation et. al. Dillard et al. v. Pittway Corporation et. al. Circuit Court of Etowah County, Alabama	Etowah Co., AL
8.	Selig Enterprises, Inc. v. ADT Security Services, Inc.; Mid-Atlantic Security v. Stimsonite; U.S.D.C., N.D. Ga.,	Atlanta, GA
9.	Lowe's Home Centers, Inc. v. Olin Corporation U.S.D.C., M.D. Ga.,	Albany, GA
10.	Federal Insurance Company a/s/o Keystone Foods Corporation, v. Cagles, Inc; U.S.D.C., N.D. Ga.,	Atlanta, GA
11.	Central Synagogue; Wausau Business Ins. Co. v. Turner Construction Co., Aris Development, et al.	New York, NY
12.	Pretzel's, Inc vs. Shambaugh & Sons, Inc., et al. State of Indiana, Wells Superior Court	Bluffton, IN
13.	Darshin and Sandeep Kakaria v. Goodwin, Lamb, etc. Fifth Circuit Court for Davidson County, TN at Nashville	Nashville, TN
14.	Mayflower Seafood Restaurant III, LLC vs. Whaley Food Service Repair, Superior Court for Rockingham County, S.C.	Madison, SC
15.	Colonial Properties v. Lowder Construction Company State Court of Bibb County, Georgia	Macon, GA
16.	Lam Lee Group v. Fire Power Systems, Inc. and Scott & Reid General Contractors, District Court, Dallas County, TX	Dallas, TX
17.	Latoya Smalls v. Bread and Roses Hospitality, Inc, et. al. Circuit Court of the 10th Judicial Circuit, Jefferson County, AL	Birmingham, AL
18.	Bristol Brass & Copper, Inc. v. AppServ, Inc., et. al. U.S.D.C., Eastern District of Tennessee at Greenville	Bristol, TN
19.	Tennessee Hotel Associates v. R.H. Sinclair Co., et al. Circuit Court for Blount County, Tennessee	Memphis, TN
20.	Kimberly-Clark Corporation v. APL Logistics, et al.	Atlanta, GA

	Northern District of Georgia, Atlanta Division	
21.	Colonial Properties v. Lowder Construction Co., et al. State Court of Bibb County, Georgia	Macon, GA
22.	Winter Construction Co. v. Safeway Fire Protection Co. Northern District of Georgia, Atlanta Division	Atlanta, GA
23.	Creative Fabricators, LLC v. S&S Sprinkler Co. LLC Eastern District, State of Louisiana	Mobile, LA
24.	Associated Grocers v. Americold, NPIC, et al. District Court of Wyandotte County, Kansas	Kansas, City, KS
25.	Hardware Imagination v. Tech-AeroFoam Products Circuit Court of 9th District, Orange County, FL	Tampa, FL
26.	Rock Tenn v. Commercial Piping, Metrolina Sprinkler, et al. Superior Court, Union County, North Carolina	Charlotte, NC
27.	Sterling Group v. Underwood Fire Equipment Company Circuit Court of Wayne County, Michigan	Detroit, MI
28.	Deere & Company v. Factory Mutual Ins. Co., et al. District Court, 7th Judicial District, Scott County, Iowa	Atlanta, GA Davenport, IA
29.	Mt. Hawley and James River v. Pallet Consultants Corp. District Court, Southern District of Florida	Miami, FL
30.	Allstate Insurance Company v. Nationwide Sales, Inc. Shonda Harper and Joseph L. Wright	Walton County, FL
31.	Ruby Tuesday, Inc. of Griffin, GA v. M&B Exhaust Services, LLC	Spaulding Co., GA
32.	AGF Springcreek Coit II v. Metro Fire Protection 44th District County of Dallas County, Texas	Dallas County, TX
33.	Camden County v. Integrated Systems, Inc. and AFEX US District Court, Southern District of GA, Brunswick District	Camden Co., GA
34.	Target Medical, Inc., Double B Investments v. Gold Dust, Inc. Circuit Court of Tennessee, 30th Judicial District at Memphis	Memphis, TN
35.	Delta Mills, Inc. v. Picanol N.V. and IH Services, Inc. Court of Common Please, Greenville, NC	Charlotte, NC
36.	Wayne Farms, et al. v. Crane Company, et al. Superior Court of Fulton County, Georgia	Gainesville, GA
37.	Cincinnati Insurance a/s/o Mid-South v. CMW, Inc., et al. 27th Judicial District, Jackson County Circuit County	Annville, KY
38.	Hutchison v. McLaughlin Custom Builders v. RSI, Woodman Insulation Co., Inc. and Tip Top Roofers Service Corp State Court of Fulton County, Georgia	Roswell, GA
40.	Nappy's of Florida, Inc. and FCCI Commercial Insurance Co. v. Gator Fire Extinguisher Company, Inc. 8th Judicial Circuit, Alachua County, Florida	Gainesville, FL
41.	Weyerhaeuser Co. LTD v. Magic Welding, ARON Services, G&M Heating and Plumbing, et al. Court of Queen's Bench of Alberta, Judicial District of Grand Prairie	Edmonton, AB

EXHIBIT B TO ARNOLD AFFIDAVIT

Designation: E 678 – 07

Standard Practice for Evaluation of Scientific or Technical Data[1]

This standard is issued under the fixed designation E 678; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice establishes criteria for evaluating scientific and technical data, and other relevant considerations, which constitute acceptable bases for forming scientific or technical expert opinions.

1.2 This practice recommends generally acceptable professional practice, although the facts and issues of each situation require specific consideration, and may involve matters not expressly dealt with herein. Deviations from this practice are not necessarily wrong or inferior, but should be documented and justified.

1.3 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

E 620 Practice for Reporting Opinions of Scientific or Technical Experts

E 860 Practice for Examining And Preparing Items That Are Or May Become Involved In Criminal or Civil Litigation

E 1020 Practice for Reporting Incidents that May Involve Criminal or Civil Litigation

E 1188 Practice for Collection and Preservation of Information and Physical Items by a Technical Investigator

3. Significance and Use

3.1 Persons engaged in forensic investigations are responsible for identifying significant data. They then analyze and correlate the data and report conclusions and opinions. These opinions should be supported by the data, reported in a form that is understandable to a layman familiar with the incident, and capable of being evaluated by knowledgeable scientists, engineers, or investigators.

3.2 This practice is intended to serve as a guideline for the scientific or technical expert in conducting an investigation, which includes analyzing and evaluating facts. In addition, this practice may assist others in understanding and evaluating the work performed. Refer to Practice E 1188 for guidance pertaining to the actual collection of information and physical evidence, and Practice E 1020 for guidance regarding the initial reporting of the incident.

4. Evaluation Procedure

4.1 This section outlines basic principles of evaluation in accordance with accepted scientific and engineering practices.

4.1.1 *Define the Problem Being Considered: The definition should include*—The expert must first define the problem being considered. The definition should include: (*1*) the allegation(s) made, (*2*) the scientific or technical issues being addressed, (*3*) the relationship between the allegation(s) and the scientific or technical issue(s), and (*4*) the relationship(s) between the scientific or technical issue(s) and the incident(s) to which the allegations(s) refer.

4.1.2 *Identification and Validity of Hypotheses*:

4.1.2.1 State and, if necessary, explain scientific or technical hypotheses and judgmental criteria used in evaluation. Specify the source, scientific and technical basis, and relationship of each hypothesis and criterion to known incident data

4.1.2.2 Address the relative scientific or technical merits of alternate hypotheses supported by the available data.

4.1.3 *Evaluation Techniques*:

4.1.3.1 Prepare and maintain a logical and traceable record of analysis and deduction. The evaluation should be quantified to the extent feasible, but should not assume greater precision than is warranted by the quality of the available data. Numerical probability estimates are acceptable only when based on

[1] This practice is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.11 on Interdisciplinary Forensic Science Standards.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

sound analytical or statistical principles, and when their confidence limits have been calculated.

5. Data for Evaluation

5.1 The evaluation process is based on the information collected and is intended to determine the most logical or reasonable explanation of the incident, accounting for all significant data. Consider three factors: (*1*) identification of the source of the data (*2*) identification of the source validity of the data; and (*3*) relevance of the data gathered.

5.1.1 Examples of data include: (*1*) observed or reconstructed objects or events (*2*) physical characteristics of persons, things and conditions involved (*3*) dates, times and locations; (*4*) physical injuries to persons and damage to objects; (*5*) product information and conditions of use

5.1.2 *Identification of Source of Data*:

5.1.2.1 Catalog all data made available to or collected by the investigator by relationship to the incident and physical characteristics. Identify quantitative data by type, for example, raw, reduced and interpreted. Specify the basis for any data reduction or analysis.

5.1.2.2 Data may also be identified by source, date, time and place. Sources may be categorized as: (*1*) testimonial (statements, affidavits, pleadings, depositions, interrogatories, etc.) (*2*) documentary (specifications, records, reports, publications, literature, manuals, drawings, photographs, etc.), and (*3*) physical (components, specimens, samples, etc.). Identify distinguishing characteristics as clearly as possible to fulfill evidentiary requirements.

5.1.3 *Validity of Data*:

Validity of data may be subject to question unless it has been generated by established procedures, such as those specified in Practice E 860, and generally accepted test methods.

5.1.3.1 Specify the source(s) of other data used in the evaluation. This practice does not preclude the use of data developed for other purposes where such data can be shown to be relevant to the conditions of the incident. Data published in peer-reviewed professional journals is generally regarded as having more validity than data published in sources without peer review.

5.1.4 *Relevance of Data*:

When reconstructing a historical event, the investigator is likely to observe more data than is pertinent to the reconstruction. Professional judgment is required to assess whether a particular piece of data is relevant.

6. Opinions

6.1 Opinions should be formed or conclusions drawn only after the data have been evaluated. Opinions or conclusions must account for all known relevant facts related to the incident and be consistent with accepted scientific and logical principles.

7. Report

7.1 Report any opinions in accordance with Practice E 620.

8. Keywords

8.1 data evaluation; data validation; forensic science; technical data